AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method for manufacturing a spark plug which comprises a tubular metallic shell, a tubular insulator extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator and with a rear end of the center electrode fixed in the insulator, and a ground electrode with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground electrode and the center electrode forming a discharge gap therebetween, and in which at least one of the center electrode and the ground electrode comprises an electrode base metal and a chip provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material, the method comprising:

(1) providing a chip made of a spark erosion resistant material comprising a flange portion and a protrusion protruding from a first face of the flange portion;

(2) tentatively joining, through resistance welding, a second face of the flange portion opposite the protrusion to a joint face of the electrode base metal of at least either one of the center electrode and the ground electrode, the joint face being located on a side toward the discharge gap; and

(3) laser-welding the flange portion to the joint face to form a weld portion comprising components of the chip in an amount of 20% by mass to 80% by mass between the electrode base metal and the chip, said weld portion extending both outwardly and a distance of D/5 or more inwardly of imaginary extension lines of generatrices of a side surface of the protrusion, said extension lines running along the side surface of the protrusion, where D represents a maximum distance between said extension lines, and

that part of the flange portion extending outside said imaginary extension lines being entirely subsumed within the weld portion,

wherein the spark erosion material is a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir, and 1% to 20% by mass Ni.

2. (original): The method for manufacturing a spark plug as claimed in claim 1, wherein the joint face is located on the electrode base metal of the ground electrode on a side toward the discharge gap.

3. (canceled).

4. (previously presented): The method for manufacturing a spark plug as claimed in claim 1, which comprises providing in step (1) a plate-like intermediate member having at least one of a melting point and linear expansion coefficient falling between that of the electrode base metal and that of the chip, and having a face larger than the second face of the flange portion; and

in step (2), providing the intermediate member between the joint face and the chip,

said weld portion comprising components of said chip, said electrode base metal and said intermediate member.

5. (original): The method for manufacturing a spark plug as claimed in claim 4, which comprises, in step (2), after the intermediate member is tentatively joined to the joint face through resistance welding, tentatively joining the second face of the flange portion to the intermediate member through resistance welding.

6. (original): The method for manufacturing a spark plug as claimed in claim 1, which comprises locating the joint face on the electrode base metal of the ground electrode on a side toward the discharge gap, and welding the chip to the ground electrode while the ground electrode is bent away from the distal end of the center electrode.

7. (canceled).

8. (canceled).

9. (previously presented): The method for manufacturing a spark plug as claimed in claim 1, wherein the weld portion contains components of the chip in an amount in the range of from 30% by mass to 60% by mass.

10. (canceled).

11. (canceled).

12. (previously presented): The method for manufacturing a spark plug as claimed in claim 1, wherein said weld portion has a shape and composition different from that of said flange portion.

13. (currently amended): A spark plug comprising: a metallic shell; a tubular insulator fixed in the metallic shell; a center electrode fixed in ~~a~~ the metallic shell; a ground electrode fixed to the metallic shell and forming a discharge gap between the center and ground electrodes; a chip having a protrusion connected with the ground electrode and formed of a spark erosion resistant material; and an intermediate member connecting the ground electrode and the chip;

wherein the spark plug further comprises a laser-weld portion connecting the ground electrode, the chip and the intermediate layer,

wherein the laser-weld portion extends both outwardly and inwardly from imaginary extension lines of generatrices of a side surface of the protrusion and comprises 20% by mass to 80% by mass of the spark erosion resistant material, said imaginary extension lines running along the side surface of the protrusion, and

wherein the intermediate member is welded to the chip and the ground electrode by resistance-welding,

wherein the spark erosion material is a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir, and 1% to 20% by mass Ni.

14. (previously presented): The spark plug as claimed in claim 13, wherein the laser-weld portion comprises components of said chip, said electrode base metal and said intermediate member.

15. (previously presented): The spark plug as claimed in claim 13, wherein the laser-weld portion comprises 30% by mass to 60% by mass of the spark erosion resistant material constituting the chip.

16. (previously presented): The spark plug as claimed in claim 13, wherein said intermediate member has at least one of a melting point and a linear expansion coefficient falling between that of the electrode base metal and that of the chip.

17. (previously presented): The spark plug as claimed in claim 13, wherein said laser-weld portion extends a distance of D/5 or more inward of said imaginary extension lines, where D represents a maximum distance between said extension lines.

18. (previously presented): A method for manufacturing a spark plug which comprises a tubular metallic shell, a tubular insulator extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator and with a rear end of the center electrode fixed in the insulator, and a ground electrode with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground electrode and the center electrode forming a discharge gap therebetween, and in which the ground electrode comprises an electrode base metal and a chip provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material, the method comprising:

(1) providing a chip comprising a flange portion and a protrusion protruding from a first face of the flange portion;

(2) tentatively joining, through resistance welding, a second face of the flange portion opposite the protrusion to a joint face of the electrode base metal of the ground electrode, the joint face being located on a side toward the discharge gap; and

(3) laser-welding the flange portion to the joint face such that a weld portion is formed between the electrode base metal of the ground electrode and the chip to reach points on the second face of the flange portion, the points being located inward of corresponding intersections of the second face of the flange portion and imaginary extension lines of generatrices of a side surface of the protrusion.

19. (canceled).

20. (canceled).

21. (new): A spark plug comprising: a metallic shell; a tubular insulator fixed in the metallic shell; a center electrode fixed in the metallic shell; a ground electrode fixed to the metallic shell and forming a discharge gap between the center and ground electrodes; and a chip having a protrusion connected with the ground electrode and formed of a spark erosion resistant material;

wherein the spark plug further comprises a laser-weld portion connecting the ground electrode and the chip,

wherein the laser-weld portion extends both outwardly and inwardly from imaginary extension lines of generatrices of a side surface of the protrusion and comprises 20% by mass to

80% by mass of the spark erosion resistant material, said imaginary extension lines running along the side surface of the protrusion, and

wherein the spark erosion material is a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir, and 1% to 20% by mass Ni.

22. (new): The spark plug as claimed in claim 21, wherein the laser-weld portion comprises components of said chip and said electrode base metal

23. (new): The spark plug as claimed in claim 21, wherein the laser-weld portion comprises 30% by mass to 60% by mass of the spark erosion resistant material constituting the chip.

24. (new): The spark plug as claimed in claim 21, wherein said laser-weld portion extends a distance of D/5 or more inward of said imaginary extension lines, where D represents a maximum distance between said extension lines.

25. (new): The method as claimed in claim 18, wherein the spark erosion resistant material is a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir, and 1% to 20% by mass Ni.

26. (new): The method as claimed in claim 18, wherein that part of the flange portion extending outside said imaginary extension lines being entirely subsumed within the weld portion.